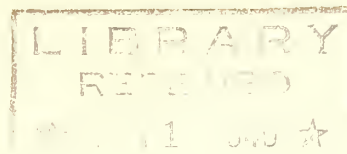


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FOOT ROT IN SHEEP

Foot rot is an infectious disease affecting the feet of sheep. It is a widespread, potential hazard to productive sheep raising and profitable sheep feeding and has from time to time been encountered throughout the United States, as well as in most, if not all, other countries where sheep are raised. The disease is apt to become particularly serious if it appears in feedlot sheep or in flocks confined in crowded corrals or pastures. Occasionally, however, it affects range sheep as well, especially during exceptionally wet seasons.

Symptoms

Usually, the first indication of the disease to be observed is lameness in a few sheep in the flock or band. But even before lameness occurs there is usually reddening and swelling of the skin just above the hoof, between the toes or at the bulb of the heel. This is later followed by an oozing of a watery fluid from the swollen areas, and finally, if the disease is not stopped, the sole and walls of the foot become undermined by the infectious process and a thin fluid pus is discharged which has a characteristically foul odor.

The first few sheep affected are usually lame only in one foot, but as the disease spreads to other sheep many may be affected in two, three, or even all four feet. With the progress of the disease, the lameness becomes more and more intense. Sheep may be so painfully affected that they will feed only when kneeling or resting on the breast. The infection penetrates deeper and deeper into the tissues until not only the ligaments and tendons but the bones and joints of the foot also are involved. In warm weather the feet may become infested with maggots. In some cases the hoof wall even sloughs from the foot.

Some severely affected sheep may die, but even the worst cases sometimes improve gradually after a few weeks, seeming to recover even without treatment. But within the long and mishaped and extremely hard hoofs, or beneath the fungoid masses which may develop between the toes, the infection often remains to break out again in the affected sheep. The disease tends to improve when sheep are on dry, well-drained land, but unless eliminated by treatment it tends to persist in affected flocks for months or even years.

Cause

Bacteriological studies of foot rot are rendered especially difficult by the fact that the feet of sheep are constantly exposed to the multitude of germs normally present in the soil, manure, and water. Tissues from feet affected with the disease have been found to contain pus-forming bacteria, spirochetes, colon bacilli, and other organisms. The organism known as Actinomyces necrophorus, which produces death of tissues it affects, is frequently found. This germ is widely prevalent and is believed to be responsible for multiple abscesses in the livers of cattle and sheep, and necrotic stomatitis, sometimes called diphtheria, of calves. This organism sometimes even affects man. Recently an entirely new germ tentatively identified as organism "K" has been discovered and described as the primary cause of the disease, other organisms (Spirochetes, Actinomyces necrophorus) playing accessory or secondary roles.

Treatment

Although the cause of the disease may not yet be wholly agreed upon by veterinary investigators, fortunately there are definite principles of treatment which, if followed, are very successful. As with other animal diseases, it is preferable that treatment and preventive measures be applied by a veterinarian, or at least under his direction and supervision.

Of first importance is the immediate examination of all sheep in the band or flock at the first signs of foot rot and the segregation of all animals showing any symptoms. At this time any excessive or abnormal growth of hoof should be pared away by using a sharp knife or pruning shears. Hoof nippers may be required in some cases. The object should be not only to restore the normal proportions and contour of the hoof but to discover as far as possible any evidence of the foot rot infection.

In typical, well-established cases the animal will usually be found to be suffering from deep-seated infections beneath the sole or the hoof wall. Proper treatment demands that such portions of the hoof as are undermined by the typical greyish necrotic tissue, which is characteristic of the disease, must be removed. In some cases, the procedure of trimming assumes the proportions of a major surgical operation. The tendency of the average untrained or inexperienced person is to follow extremes in the trimming process, removing too little or too much of the horny hoof. If too little is taken away the depths of the infected tissue cannot be reached by the antiseptic which is subsequently applied. Too drastic trimming and paring has the effect of needlessly injuring normal tissues which thus will be still further delayed in healing.

After the feet have been trimmed a suitable antiseptic should be applied. If a good job of trimming has been done, nearly any efficient antiseptic agent may suffice to curb the infection. If only a few animals are to be treated, the feet may be immersed in a bucket or other receptacle containing the antiseptic, or it may be applied by hand. The choice of method, as well as selection of the antiseptic depends upon the nature and extent of the disease and the facilities available for handling the sheep.

When large numbers of sheep are to be treated a trough of wood or other convenient material is usually constructed for use as a foot bath in applying the antiseptic. For most sheep an inside width of from 8 to 10 inches and a depth of from 4 to 6 inches is appropriate. The length for the trough will depend upon the number of sheep to be treated. A ten-foot trough is long enough for a small number but one considerably longer is preferable if several hundred sheep are to be treated. The trough may be placed along a corral fence or in a gateway. Converging wing panels or hurdles, either permanent or movable, are usually provided at the entrance to facilitate handling the sheep. Outwardly sloping panels are usually placed at the sides of the trough to effect a chute-like arrangement. The length of time each sheep should stand in the foot bath is dependent upon the nature and strength of the antiseptic used and the general extent of the disease. These are matters which, of course, are best interpreted by the attending veterinarian. Ordinarily no sheep is held in the solution for less than 2 minutes, and a longer time than 10 minutes is rarely necessary or advisable. In any event, the animals should be closely watched to insure immersion of the feet and to prevent them from lying down in the trough.

The substance most widely used in treating foot rot is a solution of copper sulphate, or so-called bluestone. The chemical, preferably powdered, is dissolved in warm water in from 10 to 50 percent solutions (about $4/5$ to $2\frac{1}{2}$ pounds per gallon) prepared preferably in enameled or earthenware vessels. If weak solutions are used, the sheep should ordinarily be held longer in the foot bath. The strongest solution may be effective in one application, while 2 or more treatments at 2 to 7 day intervals may be required if less concentrated solutions are used.

Some cases respond well to treatment with from 2 to 10 percent dilutions of formaldehyde solution (U.S.P.). This, as well as copper sulphate, is very irritant and should be handled with care. Other drugs are applicable in individual cases, depending upon the nature and extent of the disease and the facilities available for handling the animals to be treated. The longer treatment is delayed the greater will be the chance of serious loss from the disease.

In practice, some use another trough, containing water only, and placed at the end of that containing the antiseptic. This

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water bath washes dirt from the sheep's feet before they enter the medicinal bath.

If the disease is advanced and the feet are extremely sensitive after treatment, the feet should be protected by clean, soft dressings and the application of some such substance as oil of pine tar.

Prevention

As with most other infectious diseases, prevention is a much more effective means of handling than treatment after the disease develops. Because infected sheep are considered the greatest source of infection, any sheep to be added to the normal flock from outside sources should first be held in quarantine for at least a month. If no indications of foot rot appear by the end of the quarantine period, the new animals may be safely added to the flock. Sheep should preferably be bought from a source known to have been free of foot rot for at least 6 months previously. Sheep treated for the disease should not be returned to the flock until it is certain that they are normal. In some cases the most economical procedure may be to sell all the affected sheep for slaughter under inspection, thus eliminating the expense of treatment and the hazard of their presence on the premises.

Barns, sheds, troughs and corrals which have been used by infected sheep should be thoroughly cleaned and disinfected (see Farmers' Bulletins Nos. 926 and 954). All accumulations of hay, straw, and manure should be removed and preferably burned. Infective foot trimmings and dressings also should be disposed of by burning. Muddy corrals and pastures should be drained, if practicable. In severely affected flocks it may be advisable to move all the apparently normal sheep to fresh ground. It is not known exactly how long land used by sheep affected with foot rot remains infectious. If the soil is light and well drained, the rainfall limited, and if it is during hot weather with an abundance of sunshine, the infection may not survive for more than 1 or 2 weeks. Ordinarily corrals may be considered safe from the standpoint of foot rot if sheep are excluded for a month under such conditions. On the other hand, if the soil is heavy and poorly drained, and there is much rainfall and a scarcity of sunshine, a considerably longer time may be necessary before sheep can be safely returned. In northern latitudes, infected pastures are generally considered safe if sheep are withheld for 4 months during the usual cold winter season.

If separate attendants cannot be provided for the healthy sheep and those being treated for foot rot, the normal sheep should be cared for first and the others last. After handling affected sheep, attendants should cleanse themselves and disinfect all instruments used.

As an added measure of prevention, the apparently healthy portion of the band is sometimes subjected to the antiseptic foot bath above described. When this is done, old solutions which have been used by infected sheep should not be used for the healthy sheep.

Foot Rot in Other Animals

A disease similar in nature to foot rot in sheep, sometimes referred to as foot rot, foul foot, hoof rot or foul in the foot, is not infrequent in goats and cattle. Although the nature of the infective agent may vary, especially in cattle, from that found in sheep, the essentials of prevention and treatment are primarily the same in principle as those used for sheep. First, isolate affected animals, and clean and disinfect barns, sheds, troughs, corrals, etc.; second, trim the affected feet; and, third, apply antiseptics. Delayed treatment of the affliction in cattle often results in even more serious consequences than in sheep. Amputation of one claw or even an entire foot may be necessary.

A preventive procedure practiced by some dairymen consists of compelling the normal cattle in a herd where the disease has appeared to walk through a pan or trough of dry, air-slaked lime once or twice daily. The animals soon become used to the procedure if the lime is placed in a doorway or gateway habitually used by them.

Other Conditions Which May be Confused With Foot Rot

Animals compelled to travel long distances over rough, hard, gravelly or rocky roads or trails, or those pastured on exceptionally dry, sparse pastures, frequently develop foot soreness which should not be confused with foot rot. Continuously stabled animals or those pastured on low-lying, swampy lands are apt to develop grotesquely shaped, overgrown hoofs, which should be trimmed periodically to prevent lameness. Sheep pastured on muddy ground often develop an accumulation of caked and dried soil between the toes resulting in injury to the tissues which may become more or less severely infected. Sheep on stubblefields not infrequently suffer from local injuries which are likewise avenues for the entrance of non-specific infection.

Injuries due to penetrating wounds usually only occur in one or a few animals at a time, being readily identified. The principles of good treatment, including nursing, would require the confinement of such animals until recovery results.

Whatever the suspicions of the livestockman as to the nature and cause of disease in animals, the best course always is to consult a veterinarian promptly.

